REMARKS

Reconsideration and allowance of the subject application are respectfully requested.

The Examiner maintains the rejections from the first office action. As Applicants currently understand the final action, the following is the Examiner's mapping of Walton to claim 1 (numerals are in Figure 7 in Walton). Figure 7 illustrates an access point and two user terminals [0026].

1. A communication method for use in a communication network involving several user terminals (120x-120y) communicating with at least one transmitter node (access point 110x), said transmitter node comprising a plurality of antennas (724a-d), each of said user terminals comprising at least one antenna, said method comprising;

selecting a first set of user terminals comprising at least one user terminal (120y-multiple antenna UE);

selecting a second set of user terminals not comprised in the first set (120x-single antenna UE);

adapting first physical layer communication parameters (multiple spatial channels) for the first set of user terminals (120y-multiple antenna UE) according to a first principle (spatial multiplexing mode) suitable for optimizing communication with the first set of user terminals;

adapting second physical layer communication parameters (one spatial channel), different from the first physical layer communications parameters (multiple spatial channels), for the second set of user terminals (120x-single antenna UE) according to a second principle (diversity mode-can be used with single antenna UE 120x), which is different from the first principle, in response to the first physical layer communication parameters for the first set ("selecting the user terminal [UE 120y] based on feedback information [from UE 120x] is interpreted to be selecting a second set of user terminals in response to parameters of a first set of user terminals" see page 3 of the office action); and

transmitting to the first set of user terminals (120y) according to the first physical layer communication parameters (multiple spatial channels) and to the second set of user terminals (120x) according to the second physical layer communication parameters (one spatial channel).

Although Applicants disagree with this mapping, to further specify the meaning of the claimed principles, the subject matter of claims 2 and 3 is incorporated into claim 1, dependent claims 9 and 10 are incorporated into claim 8, and dependent claims 17 and 18 are incorporated into claim 16. These amendments define a different character in the type of feedback and how this feedback is used for adaptation in the communication for a link and between links: full or

partial channel state information (which is complex-valued) and opportunistic MIMO that inherently feeds back measured signal to noise ratio or a function thereof which are real-valued scalars. See for example claim 16 which recites: "wherein the first adaptation circuitry is arranged to optimize communication with the first set of user terminals with respect to full or partial Channel State Information (CSI) by Singular Value Decomposition (SVD), and wherein the second adaptation circuitry is arranged to optimize communication with the second set of user terminals according to opportunistic MIMO communication."

In contrast to the claimed technology, Walton focuses on selecting particular transmission rates and transmission modes for a particular user terminal for transmission in a current scheduling interval. See for example claim 1 of Walton. The claims achieve improved-performance, MIMO communication by dividing user terminals into two groups and optimizing communication with respect to the first group of one or more users while at the same time using network resources in an efficient way for the other users in the second group. The first group of UEs is optimized with respect to particular channel state information (CSI) with a single value decomposition (SVD) of the channel matrix and opportunistic MIMO communication is used advantageously for communication with other users in the second group. By adapting the transmission and possibly power allocation parameters of different streams in the second group based on the channel state information obtained for the user(s) in the first group, performance improves for all of the users in the first and second groups as compared to transmitting just the data for which the communication is optimized. The Examiner does not point out where Walton teaches this significant and advantageous feature.

Although the Examiner admits that Walton fails to teach that each of user terminals has communication parameters adapted according to respective principles, the Examiner asserts that

Walton discloses that spatial multiplexing can be used with a multi-antenna user terminal while diversity is used with a single antenna user terminal. Based on these two different transmission modes, the Examiner asserts that it would be obvious to use a different number of antennas in each user terminal "effectively using different communication parameters for each terminal, based on cost considerations, safety issues, and other factors." Paragraph [0052] relied on by the Examiner for this conclusion simply states that the number of antennas employed in a user terminal depends on various factors such as those cited by the Examiner. There is no teaching by Walton in this paragraph of each user terminal "effectively using different communication parameters" "based on cost considerations, safety issues and other factors."

The Examiner also admits Walton fails to describe that the second principle uses opportunistic MIMO communication but relies on the Dong reference. There are multiple reasons why it would not have been obvious to combine the opportunistic MIMO teachings of Dong with the Walton system to "maximize total system capacity." First, even though SVD-MIMO and opportunistic MIMO have been known for almost 10 years, they have not been combined as claimed. The inventors of the schemes proposed by Walton and Dong likely considered them to be near optimal with respect to the assumptions they have chosen. For example, while SVD-MIMO with waterfilling is capacity optimal, it is only optimal when considering one user. Opportunistic-MIMO is nearly capacity optimal. But it is only nearly optimal when considering a large number of users. The natural extension of SVD-MIMO is not towards what is claimed, but rather to extend the SVD-MIMO scheme that is based on adjusting the matrix weights for diagonalizing the MIMO channel to multiple users. One would then choose a sender weight matrix and a suitable receiver weight matrix for each receiver such that some overall performance measure would be maximized. This normally does not provide

orthogonal channels. For opportunistic MIMO, the assumption is that the cells are planned and ensure that there are a large number of users most of the time.

When SVD-MIMO and opportunistic MIMO are combined as recited in the independent claims, the resulting performance exceeds that of the better of the two schemes. As a result, good performance is provided in situations with more than one user but less than a very large number of users. None of this is addressed in Walton or Dong.

This kind of unexpected result is long recognized as strong evidence of non-obviousness. See for example the *KSR* Int'l Co. v. Teleflex, 82 USPQ2d 1385, 1395 (2007) ("The fact that the elements worked together in an unexpected and fruitful manner supported the conclusion the ... design was not obvious to those skilled in the art.") Thus, it would not have been obvious to combine the opportunistic MIMO teachings of Dong with the Walton system.

The application is in condition for allowance. An early notice to that effect is earnestly solicited.

Respectfully submitted,

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